MONEY UNDER BOTTLE

A bottle balances precariously on it's mouth. Nothing special, right? Well… put a dollar bill underneath the bottles mouth. Now, bet your friends a dollar that they can't pull the dollar out from under the bottle without knocking it over. Sit back and enjoy their futile attempts as friend after friend knocks the bottle over. What's the secret? Read on to find out!

###### **MATERIALS**

* Dollar bill
* Glass bottle

###### **EXPERIMENT**

1. Place a flat dollar bill on a smooth, flat surface.
2. Balance a bottle, on its mouth, right over the top of George Washington's face.
3. Tell your friends that they can have the dollar if they can pull it out from under the bottle without making the bottle fall.
4. Watch them fail. Watch them fail a lot.'
5. You should probably show them how it's done. Carefully roll the dollar bill, from one end, towards the bottle.
6. When the rolled up dollar gets to the mouth of the bottle, continue rolling, but be careful to nudge the bottle towards the opposite edge.
7. Once the bottle is off of the edge… you've made a buck!

###### **HOW DOES IT WORK?**

The key to safely removing the bottle from atop the dollar bill comes from friction and inertia. Inertia comes from Newton's first law of motion, stating that an object in motion (or at rest) tends to stay in motion (or at rest). This means that the balanced bottle wants to stay in the position, in that spot. However, when you attempt to remove the dollar bill, you apply an outside force that causes the bottle to topple over.

This is where friction becomes a factor. There is friction between the dollar bill and bottle. There is so much friction that the dollar bill pulls the bottom of the bottle with it. To overcome the friction, you roll the dollar bill to the edge of the bottle. This process is slow-moving, but there isn't enough movement to tip the bottle.